FINAL REPORT ~ FHWA-OK-16-01

IMPLEMENTATION OF PESTICIDE APPLICATOR CERTIFICATION SCHOOLS AND CONTINUING EDUCATION WORKSHOPS

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Oklahoma Department of Transportation

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IMPLEMENTATION OF PESTICIDE APPLICATOR CERTIFICATION SCHOOLS AND CONTINUING EDUCATION WORKSHOPS

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ODOT SP&R ITEM NUMBER 2156 TASK 1

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16. ABSTRACT

The Oklahoma Department of Transportation's (ODOT) herbicide applicator training program consists of initial pesticide applicator training schools, independent certification testing, sprayer calibration workshops and on-going yearly continuing education sessions. In support of this on-going effort, three pesticide applicator initial certification schools were conducted by Oklahoma State University (OSU) extension staff in fall of 2014 to train a total of 79 ODOT participants. Seventy-six of the attendees at these workshops took the Core as well as Right-of-Way Certification exams administered by the Oklahoma Department of Agriculture, Food & Forestry (ODAFF). Sixty-eight percent (52 participants) passed both the Core and Category 6 (Right-of-Way) examinations to become Oklahoma Certified Pesticide Applicators. Fourteen Pesticide Applicator Continuing Education (CEU) Workshops were conducted by OSU extension staff across a total of eight ODOT Field Divisions in 2015 to provide 642 Certified Applicators with continuing education training. Records of participation in ODAFF approved CEU programs by ODOT personnel were furnished to ODAFF as well as the ODOT Field Divisions, the Maintenance Division Headquarters and the Materials and Research Division. Participation in CEU workshops resulted in granting of CEU credit to ODOT participants in the workshops. The ODOT participants also gained knowledge on various Integrated Pest Management (IPM) and Integrated Vegetation Management (IVM) products, topics and techniques. This increase or maintained operational knowledge of the participants should insure continued effective vegetation management skills.

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SI* (MODERN METRIC) CONVERSION FACTORS

APPROXIMATE CONVERSIONS TO SI UNITS				
SYMBOL	**WHEN YOU KNOW**	**MULTIPLY BY**	**TO FIND**	**SYMBOL**
LENGTH				
in	Inches	25.4	millimeters	mm
ft	Feet	0.305	meters	m
yd	Yards	0.914	meters	m
mi	Miles	1.61	kilometers	km
AREA				
in^2	square inches	645.2	square millimeters	mm^2
ft^2	square feet	0.093	square meters	m^2
yd^2	square yard	0.836	square meters	m^2
A	Acres	0.405	hectares	ha
mi^2	square miles	2.59	square kilometers	km^2
VOLUME				
fl oz	fluid ounces	29.57	milliliters	mL
gal	Gallons	3.785	liters	L
ft^3	cubic feet	0.028	cubic meters	m^3
yd^3	cubic yards	0.765	cubic meters	m^3
NOTE: volumes greater than 1000 L shall be shown in m^3				
MASS				
oz	Ounces	28.35	grams	g
lb	Pounds	0.454	kilograms	kg
T	short tons (2000 lb)	0.907	megagrams (or "metric ton")	Mg (or "t")
TEMPERATURE (exact degrees)				
ºF	Fahrenheit	5 (F-32)/9 or (F-32)/1.8	Celsius	ºC
ILLUMINATION				
fc	foot-candles	10.76	lux	lx
fl	foot-Lamberts	3.426	candela/m^2	cd/m^2
FORCE and PRESSURE or STRESS				
lbf	Poundforce	4.45	newtons	N
lbf/in^2	poundforce per square inch	6.89	kilopascals	kPa

APPROXIMATE CONVERSIONS FROM SI UNITS				
SYMBOL	**WHEN YOU KNOW**	**MULTIPLY BY**	**TO FIND**	**SYMBOL**
LENGTH				
mm	Millimeters	0.039	inches	in
m	Meters	3.28	feet	ft
m	Meters	1.09	yards	yd
km	Kilometers	0.621	miles	mi
AREA				
mm^2	square millimeters	0.0016	square inches	in^2
m^2	square meters	10.764	square feet	ft^2
m^2	square meters	1.195	square yards	yd^2
ha	Hectares	2.47	acres	A
km^2	square kilometers	0.386	square miles	mi^2
VOLUME				
mL	Milliliters	0.034	fluid ounces	fl oz
L	Liters	0.264	gallons	gal
m^3	cubic meters	35.314	cubic feet	ft^3
m^3	cubic meters	1.307	cubic yards	yd^3
MASS				
g	Grams	0.035	ounces	oz
kg	Kilograms	2.202	pounds	lb
Mg (or "t")	megagrams (or "metric ton")	1.103	short tons (2000 lb)	T
TEMPERATURE (exact degrees)				
ºC	Celsius	1.8C+32	Fahrenheit	ºF
ILLUMINATION				
lx	Lux	0.0929	foot-candles	fc
cd/m^2	candela/m^2	0.2919	foot-Lamberts	fl
FORCE and PRESSURE or STRESS				
N	Newtons	0.225	poundforce	lbf
kPa	Kilopascals	0.145	poundforce per square inch	lbf/in^2

*SI is the symbol for the International System of Units. Appropriate rounding should be made to comply with Section 4 of ASTM E380.

Table of Contents

List of Tables

1.0 INTRODUCTION

The Oklahoma Department of Transportation (ODOT) continues their use of an integrated roadside vegetation management (IRVM) program to provide cost-effective management for vegetation on roadside right-of-way (1). This effort involves proper vegetation selection, installation and post-installation management. After vegetation installment, management involves selective mowing and weed control (1) and occasional re-establishment on a limited basis. The ability to properly select and apply herbicides for right-of-way weed control is a technical skill that is not taught in primary or secondary school. This specialized training is not otherwise available to ODOT through any current in-house training, nor through the normal non-contractual services provided by the Oklahoma Cooperative Extension Service.

Because there is some turnover in ODOT roadside vegetation management field staff each year, an on-going pesticide applicator training and certification effort is necessary. Due to changes in state and federal rules/regulations, new herbicide product development, new pesticide application equipment, product patent expiration and subsequent generic product offerings, changes in industry product marketing agreements, changes in products being awarded the state competitive bid contract, and lastly, evolving weed problems. This fluidity in the vegetation management profession necessitates an on-going education effort to ODOT herbicide applicators.

In 1995 ODOT developed the Herbicide Program Policy Directive D-504-1 (2). The Directive includes requirements that all personnel applying herbicides must be Certified Pesticide Applicators under the requirements administered by the Oklahoma Department of Agriculture, Food and Forestry (ODAFF). The Directive (2) also requires anyone involved in herbicide application attend an annual training program pertinent to vegetation management.

2.0 OBJECTIVES

1. To conduct yearly herbicide applicator certification schools that will help prepare new ODOT personnel for subsequent pesticide applicator testing and certification.
2. To provide each of the eight ODOT Field Divisions with yearly herbicide applicator continuing education (CEU) workshops.

3.0 BACKGROUND AND SIGNIFICANCE OF WORK

For the past 29 years, annual pesticide applicator certification schools have been conducted on an "as-needed" basis as a part of the joint roadside vegetation management and training projects between ODOT and Oklahoma State University (OSU). These schools provide timely initial training of ODOT personnel attempting to become Oklahoma Certified Pesticide Applicators.

Under Task 1 in our FY2015 Joint Project Proposal covering *Roadside Vegetation Management Training and Consultation,* we proposed to continue to offer these schools which help prepare ODOT personnel for the rigors of two 100 question exams that must be passed for ODOT personnel to become certified in Oklahoma Category 6 (Right-of-Way). Certification in Category 6 (Right-of-Way) qualifies the applicator for use of pesticides for public road maintenance, power line maintenance, railroad right-of-way, storage tank areas, and other similar areas (3). Certification in Category 5 (Aquatic) qualifies the applicator for treatment of weeds in standing or running water in man-made and/or natural impoundments, streams, etc. (3). Category 6 certification excludes public health activities (e.g. mosquito control) and water in totally closed systems.

ODOT Field Divisions have hosted yearly CEU workshops in Category 6 (Right-of-Way) for the last 29 years. We proposed and were contracted to conduct these continuing education (CEU) workshops under Task 1 in our FY2015 Joint Project Proposal covering *Roadside Vegetation Management Training and Consultation.* These workshops have annually supplied current and vital information to approximately 650 Certified Applicators in ODOT each year. There may continue to be a need for some applicators to also obtain training in Oklahoma Category 5 (Aquatic Pest Control). This is due to the fact that some applicators need to treat aquatic sites located on lands managed by ODOT.

4.0 PURPOSE

The purpose of the Pesticide Applicator Certification schools was to train participants to understand the basics of integrated pest management (IPM) as well as to become Certified Applicators by passing the designated tests. After gaining a fundamental understanding of IPM and becoming a Certified Applicator, the individual is usually ready to be given specific assignments by in-house ODOT mentors. Trainees are prepared to be successful at managing weeds on Oklahoma roadsides. The initial Pesticide Applicator Certification prepares the new Certified Applicators for participation in annual pesticide applicator continuing education (CEU Workshops) so that they can comply with ODOT policy as well as maintain their certification in Oklahoma. Also, the initial training prepares the new applicator for training in the herbicide application equipment calibration workshops offered by the OSU RVM program under Task 4 of the Project 2156 proposal.

5.0 IMPLEMENTATION OF PESTICIDE APPLICATOR CERTIFICATION SCHOOLS AND TESTING

5.1 PREPARATIONS FOR FEDERAL FY2015 CERTIFIED APPLICATOR SCHOOLS

Division and Maintenance Engineers were contacted by phone and email in spring through fall of 2014 to estimate i) the number of participants for fall 2014 certification schools as well as ii) determine suitability of proposed specific training dates and locations of training. During this same time period ODAFF was contacted to determine the availability of personnel to administer the Oklahoma Certified Pesticide Applicator core and category specific applicator exams. Upon obtaining this information from all parties, the dates, times and locations of the three certification schools were set and the necessary information was provided in emails sent in August and September 2014 to ODOT Division and Maintenance Engineers and ODAFF. Additionally, in those emails the Division and Maintenance leaders were asked to secure two training documents for their participants using the order form for Pesticide Applicator Certification Manuals from Oklahoma State University Central Mailing Services via the internet at: http://pested.okstate.edu/order.pdf. The email also contained information explaining that the *Oklahoma Pesticide Laws & Rules* manual is no longer available for order and must now be downloaded and printed from the following website http://www.oda.state.ok.us/forms/cps/cpl.pdf or picked up at the ODAFF Headquarters in Oklahoma City. The specific training materials to be acquired by the Divisions for their personal were i) *Applying Pesticides Correctly* (Revised 2012), ii) the Category 6: *Right-of-Way Study Guide* (Revised 2009) and iii) the *Oklahoma Pesticide Laws & Rules* (Revised 2008).

5.2 PESTICIDE APPLICATOR CERTIFICATION SCHOOLS

Three Pesticide Applicator Certification Schools were presented to ODOT staff in fall of 2014. These Federal FY 2015 Schools were conducted on October 28-30 at the Caddo Kiowa Technology Center (Fort Cobb); November 18-19 at ODOT Division 8 Headquarters (Tulsa) with certification testing held on November 20 at Tulsa Community College; and December 9-11 at the Kiamichi Technology Center (McAlester). Participants were 23, 28, and 28, ODOT staff [79 total] in the three FY2015 schools, respectively, compared to a total 128 and 103 ODOT participants in Federal FY2013 and FY2014 respectively (6,7).

The first and second day of each of the three schools were conducted from 8:45 a.m. to 3:30 p.m. The schools were held using a classroom-style set up. Presentation of information was via an oral lecture using Smart Board peripheral display technology (SMART Technologies, Calgary, AB T2L 1Y1, Canada), Microsoft Power Point visual aids, and printed handouts. Participants were encouraged to ask questions during the lecture. A question and answer segment was provided immediately following

each topic lecture. Instructors for the schools were Mr. Clayton Hurst, B.S., Extension Associate, and Mrs. Lydia Calhoun, B.S., Extension Assistant.

5.3 SPECIFIC TOPICS OF PESTICIDE APPLICATOR CERTIFICATION SCHOOLS

Topics included in each of the three ODOT Certified Applicator Schools were: integrated pest management (IPM), IPM terminology, state and federal rules and regulations, pest identification, mechanical and cultural pest management strategies, understanding pesticide labels and material safety data sheets (MSDS), personal protective equipment (PPE), pesticide selection, pesticide application techniques, spray system technologies, environmental protection, application recordkeeping, proper pesticide storage and disposal and how to obtain pesticide applicator continuing education. These topics were drawn from the three key training manuals that Division and/or Maintenance Engineers had acquired for their employees in advance of the training. The training included and was consistent with the presentation of information in the three training manuals discussed under section 5.1 of this report. OSU personnel also handed out copies of supplemental information that would be useful to ODOT personnel as they assumed their roll in ODOT vegetation management activities following initial certification as Oklahoma Pesticide Applicators.

5.4 APPLICATOR TESTING AND ACHIEVEMENT OF CERTIFICATION

On the third day of each of three FY2015 schools, pesticide applicator testing was conducted from 9:00 a.m. - 12:00 p.m. by representatives of the Oklahoma Department of Agriculture, Food and Forestry (ODAFF). ODOT personnel first took the core exam; a 100 question multiple choice written exam. ODAFF representatives then scored the participants core exam. Personnel that passed the core exam were next allowed to take the 100 question multiple choice written category specific exam. The category specific exam of most interest to ODOT was the Category 6 (Right-of-Way) exam although in some years there are ODOT personnel that also take the Category 5 (Aquatic Weed Control) exam.

Passing the core exam and category specific exam was required in order to become a Certified Pesticide Applicator in Oklahoma. Of the 79 participants in the 3 certification schools, 76 people tested for certification and 52 passed both the core and Category 6 (Right-of-Way) exam to become Oklahoma Certified Pesticide Applicators in Category 6. Thus, the FY2015 ODOT Certified Applicator School participants had an overall 68% pass rate in taking the certification exams compared with an overall pass rate of 86% for participants in FY2011, (4) 93% in FY2012 (5), 79% in FY2013 (6) and 79% in FY2014 (7).

5.5 POST-TESTING NOTICE OF CERTIFICATION OF PERSONNEL

Following the testing of ODOT employees, ODAFF provided the test scores and notification of achievement of certification in the Right-of-Way category to OSU RVM program Extension Associate Mr. Clayton Hurst. Mr. Hurst then sent the information on

these 79 individuals to their respective ODOT Division Headquarters, to the ODOT Maintenance Division headquarters in Oklahoma City and to the ODOT Materials and Research Division.

5.6 POST-TESTING RECORDKEEPING AT OKLAHOMA STATE UNIVERSITY

Upon receiving the results of testing and certification from ODAFF for ODOT participants at the three certification schools, Mr. Clayton Hurst, Extension Associate and Mrs. Lydia Calhoun, Extension Assistant in our program, entered the applicator names, ODOT employee number, employee Certified Applicator number, Division of employment, date of testing, testing score and categories of certification into our certified pesticide applicator database. This database is maintained under the Task 2 Objective: *Maintain Pesticide Applicator Training Records for ODOT Certified Pesticide Applicators*, as a part of the Joint Project 2156: *Roadside Vegetation Management Training & Consultation*. Several times per year, ODOT administrative personnel request verification of applicator certification status and the number of CEUs earned by applicators participating in past OSU CEU programs.

6.0 IMPLEMENTATION OF PESTICIDE APPLICATOR CONTINUING EDUCATION (CEU) WORKSHOPS

6.1 PESTICIDE APPLICATOR CONTINUING EDUCATION WORKSHOPS

Fourteen Pesticide Applicator Continuing Education (CEU) Workshops were conducted in FY2015. The locations, dates and attendance at each of the workshops are shown in Table 1. The workshops were approved by ODAFF as program OK-15-014 and awarded up to five pesticide applicator CEUs in Category 6 (Right-of-way) as well as up to five CEU in Category 5 (Aquatic). The training agenda for the CEU programs is shown in Table 2. Our instructors for the CEU Workshops were Extension Associate, Mr. Clayton Hurst, B.S., and Extension Assistant, Mrs. Lydia Calhoun, B.S.

Participant numbers were high enough that two workshops were required in each Division with the exception of Division 2 and 6, in which only a single workshop was offered. A total of 642 Certified Pesticide Applicators were trained in the FY2015 CEU workshops as compared to a total of 605 individuals in FY2011 (4), 610 in FY2012 (5), 640 in FY2013 (6) and 637 in FY2014 (7). This represents a 0.78% increase in attendance from 2014.

6.2 CEU AWARDING AND POST WORKSHOP RECORDKEEPING

Attendance records of participants in the ODAFF approved CEU programs were supplied to ODAFF so that attendees could be awarded CEUs by ODAFF. Attendance records were also supplied to ODOT Division and Maintenance Engineers, the Maintenance Division Headquarters and the Materials and Research Division. Our

records of attendance maintained under Task 2 of Joint Project 2156 were updated to reflect the participation of the 642 applicators in the 2015 CEU workshops.

7.0 SUMMARY AND CONCLUSIONS

Three pesticide applicator certification schools were conducted from October 2014 to December 2014 to train a total of 79 participants. Seventy-six of the attendees at these workshops took the certification exams administered by the Oklahoma Department of Agriculture, Food & Forestry (ODAFF). Of these 76 people, 49 participants passed both the Core and Category 6 (Right-of-Way) exam to become Oklahoma Certified Pesticide Applicators in Category 6 (a 68% pass rate). Division and Maintenance Engineers as well as Oklahoma Department of Transportation (ODOT) Maintenance Division Headquarters and the State Materials and Research Division were furnished with applicator contact information and certification status/information. Certified applicator information was used to update the pesticide applicator records maintained by OSU for ODOT.

Fourteen Pesticide Applicator Continuing Education (CEU) Workshops were conducted across a total of 8 ODOT Field Divisions in the months of February, March and one Workshop in April of 2015. Two of the original workshops scheduled for February were postponed due to winter weather conditions; both of the workshops took place in March. A total of 642 Certified Applicators received continuing education training. Records of participation in ODAFF approved CEU programs by ODOT personnel were furnished to ODOT Field Divisions and the Maintenance Division Headquarters on April 29. ODAFF along with the Materials and Research Division were provided with the participation records on May 8. Participation in CEU workshops resulted in granting of CEUs to ODOT participants in the workshops. ODOT participants also gained knowledge on various Integrated Pest Management and Integrated Vegetation Management products, topics and techniques. This increase or maintained operational knowledge of attendees and should insure continued effective vegetation management skills. This training is believed to be essential in delivery of cost-effective vegetation management on Oklahoma roadsides.

As of the close of FY2015, the OSU-RVM program maintained records of pesticide applicator certification status and educational session participation for ODOT Certified Pesticide Applicators. These records will be carried forward into Federal FY2016 under the terms of the current Joint 2156 ODOT/OSU Project.

Table 1. 2015 ODOT Herbicide Applicator Continuing Education (CEU) Workshop Schedule and Attendance.

CEU Workshop Dates	Day of Week	ODOT Division	Location	Attendance by Division
February 10	Tuesday	Div. 1	Muskogee HQ	Div. 1 - 93
February 11	Wednesday	Div. 1	Muskogee HQ	
February 17	Tuesday	Div. 3	Ada HQ	Div. 3 - 93
February 18	Wednesday	Div. 3	Ada HQ	
February 19	Thursday	Div. 2	Antlers HQ	Div. 2 - 76
March 11	Wednesday	Div. 7	Duncan HQ	Div. 7 - 88
March 18	Wednesday	Div. 7	Duncan HQ	
March 9	Monday	Div. 4	Perry HQ	Div. 4 - 72
March 10	Tuesday	Div. 4	Perry HQ	
March 19	Thursday	Div. 6	Woodward – High Plains Technology Center	Div. 6 - 28
March 25	Wednesday	Div. 8	Tulsa HQ	Div. 8 - 82
March 26	Thursday	Div. 8	Tulsa HQ	
March 31	Thursday	Div. 5	Clinton HQ	Div. 5 -111
April 1	Wednesday	Div. 5	Clinton HQ	
			Total[1]	642

[1] Total attendance represents the total number of ODOT employees who attended that were also Certified Oklahoma Pesticide Applicators.

Table 2. Agenda for the 2015 - 29th Annual Oklahoma Department of Transportation Herbicide Applicator Continuing Education Workshops.

Time	Topic	Presenter
8:30–8:55 am	**Registration**	
8:55–9:45 am	**Equipment Selection and the Importance of Sprayer Equipment Care and Calibration** Applicator equipment available for managing pest populations on roadsides will be discussed. General spray equipment care and proper calibration techniques will be stressed. Furthermore, the importance of coordinating chemical and mechanical vegetation control operations will be discussed in an effort to promote effective integrated pest management.	**Clayton Hurst**
9:45–10:15 am	**Combined Pesticide Laws and Rules Review and E-958 Updates** The Oklahoma Combined Pesticide Laws and Rules will be reviewed. Furthermore, this presentation will discuss some of the recent changes made to Circular E-958, *Suggested Maintenance Practices for Roadside Weed and Brush Problems*. Discussion will be held regarding ODOT's internal Blue Line Policies. Discussion was held regarding ODOT Blueline Policies and questions were answered by Ms. Michele Dolan, Amber McIntyre and Mr. Kevin Bloss.	**Clayton Hurst or Lydia Calhoun**
10:15–10:30 am	**Break**	
10:30–11:15 am	**Broadleaf Weed Identification and Available Control Options** Common broadleaf weed species found on Oklahoma roadsides will be discussed. Broadleaf weed characteristics will be discussed including growth characteristics and life cycles to help applicators enhance their ability to identify target weeds and select control options. Control options will be discussed with emphasis on proper application rates, use precautions, application techniques and application timing.	**Lydia Calhoun**
11:15 am–12:00 pm	**Grass Type Weed Identification and Available Control Option** Common problematic grassy weed species encounter on Oklahoma roadsides will be discussed. Plant characteristics and growing cycles will be discussed in an effort to help applicators improve their ability to identify target weeds and determine proper control options. Control options will be discussed with emphasis on proper application rates, use precautions, application techniques and application timing.	**Clayton Hurst**
12:00–1:00 pm	**Lunch**	

Time	Topic	Presenter
1:00–1:50 pm	**How Treatments Can Fail and the Importance of Pre Application Scouting and Post Application Evaluation** Some of the more common reasons herbicide treatments can fail will be discussed in an effort to help applicators avoid such common mistakes in the future while performing herbicide operations. Additionally, the importance of pre application scouting and post application evaluation will be discussed.	**Clayton Hurst**
1:50–2:05 pm	**Break**	
2:05–3:05 pm	**Pesticide Effects on Pollinators and Endangered Species** This presentation will discuss pesticide types considered to be more toxic to pollinators. Discussion will cover the growing concern on the decline of honey bee populations and how improper use of pesticides could be one of the contributing factors to this decline. Strategies to help applicators better protect bee populations while conducting spray operations will be discussed. The second part of the presentation will discuss endangered species found in Oklahoma and how their populations, habitat and health can be affected by improper pesticide use. Pesticides types considered more detrimental to endangered species and some of the policies associated with pesticide use and endangers species will be discussed.	**Lydia Calhoun**

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